RFR # DFW-2018-037:

Status and Population Dynamics of Little Brown Bats in Massachusetts

Introduction

A chief function of the Natural Heritage & Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries and Wildlife (MassWildlife) is to work toward the conservation of native plant and animal diversity in the Commonwealth, especially with respect to rare or otherwise vulnerable species. To achieve conservation objectives for those species and manage their populations effectively, MassWildlife must have a thorough understanding of their statewide distributions and abundances. To prioritize conservation and management actions, MassWildlife must also have local-level information about population ecology.

After the mortality of 99.9+% of the known hibernating Little Brown Bats (*Myotis lucifugus*) in Massachusetts from White-nose Syndrome (WNS), MassWildlife was relieved that the well-studied maternity colony at Moore State Park remained extant and relatively large. Additionally, a private researcher later confirmed extant Little Brown Bat maternity colonies at a few other sites across Massachusetts.

Statewide acoustic surveys conducted for the Department of Transportation (MassDOT) in the summer of 2015 documented the continued existence of Northern Long-eared Bats (*Myotis septentrionalis*) at several sites along the coast, Little Brown Bats at numerous locations in central and western MA, and even Small-footed Bats (*Myotis leibii*) at a few locations in western MA.

Through a Competitive Section 6 Funding Opportunity in 2016 and 2017, MassWildlife funded a special survey effort to investigate the factors influencing Little Brown Bat populations in Massachusetts. MassWildlife contracted with external biologists to further determine the extent of Little Brown Bat distribution in Massachusetts, and to locate additional maternity colonies that can be monitored and protected. Acoustic detection, mist netting, radio telemetry, and visits to sites reported by the public were undertaken. As a result, Little Brown Bats were found to be present at nine total sites of the approximately 30 sites surveyed. Little Brown Bats were detected acoustically at six locations, seven individual Little Brown Bats were captured in mist nets, and three new maternity colonies were located.

Through this study, MassWildlife seeks to further capture and radio track Little Brown Bats to maternity sites where the species was detected acoustically in the 2017 surveys, at several sites where the species was detected by MassDOT in 2015, and other sites as time allows. These efforts will undoubtedly result in the location of additional new Little Brown Bat maternity colonies that can be monitored and protected. Knowing the location and size of the maternity colonies would greatly benefit conservation efforts of surviving bats in areas impacted by WNS. MassWildlife is committed to determining the post-WNS status of Little Brown Bats in Massachusetts, and working to reduce the vulnerability of their surviving populations.

Specific Tasks

The Applicant will:

1) Deploy mist nets at or near sites where Little Brown Bats have been detected post-WNS, recording and banding all bats captured, and attach radio transmitters particularly to adult female Little Brown Bats in order to locate maternity colonies.
2) Conduct radio tracking of transmittered individual Little Brown Bats in an attempt to locate day roost sites and maternity colonies.
3) Conduct passive acoustic surveys, in conjunction with mist netting, at or near sites where Little Brown Bats have been detected post-WNS.
4) Monitor any newly discovered maternity colonies to determine colony size, site ownership, and security of the colony.
5) Conduct site visits and emergence counts at locations reported by the public to determine continued use, species of bat present, size of colony, ownership, and security of the site, noting characteristics of the roosting structures.
6) Continue the bat outreach program to facilitate information flow to external audiences, i.e. the public and private land owners/managers, about the ecological importance of bats, the impacts of WNS, bat conservation, and the importance of roosts.

Study Area

Surveys may be conducted throughout Massachusetts, but will likely focus on the central and western parts of the state. Specific sites to be surveyed will include locations at or near previous DOT detection sites for Little Brown Bats, locations of bat colonies reported by the public, and other locations identified in consultation with MassWildlife.

Methods

Mist Netting: Mist netting locations will be chosen based on the prior-detected presence of Little Brown Bats and key habitat characteristics. Mist netting will be conducted from 15 May through 31 July 2018 in an effort to capture adult female Little Brown Bats that can be tracked back to their maternity colonies and day roost sites.

Radio Transmitter Deployment & Radio Telemetry Surveys: Any adult female Little Brown Bat captured during mist netting efforts will have a radio transmitter attached, and tracking it to its maternity colony will immediately become a top priority.

Banding: All state-listed bats captured, and some individuals of non-listed species of bats, will be banded to increase our understanding of the individuals and their use of known hibernacula. Banding will also provide an opportunity to determine site fidelity by recapturing previously banded individuals. Examining the age distribution and reproductive status of the bats captured will provide an index for the reproductive success of the colony. Banding could also help determine where bats from each population hibernate.

Emergence Counts: Emergence counts will be conducted at roost locations reported by the public to determine the number and species of bats using each roost location. A consistent

and accurate population count will allow the state to track annual population size fluctuations and the reproductive success of each colony.

Passive Acoustic Monitoring: Passive acoustic detectors will be set up and operated in conjunction with mist netting efforts, at or near sites where Little Brown Bats have been previously detected post-WNS, and other locations identified in consultation with MassWildlife. All calls will be recorded, classified, and catalogued using an USFWS approved auto-classification software to document and identify which species of bats were present during the period that mist nets were deployed.

Surveys of Special Habitats or Sites: If time permits, passive acoustic surveys may be conducted at locations of unusual habitats (i.e. rock cliffs and/or talus slopes), or at special locations to document the species present and their relative abundance. These surveys will allow for a better understanding of species composition and the distribution of bats across Massachusetts.

Public Outreach: Reports by the public of significant colonies and/or roost sites will be followed-up on to obtain further detailed information and to determine whether a site visit is necessary with the intent of locating unknown maternity colonies and roost sites. For site visits, contact will be made with landowners to gain access to roost locations. The contractor will educate the public and private landowners/managers about the ecological importance of bats, the impacts of WNS, bat conservation, and the importance of roosts. Landowners will also be informed about non-lethal methods of evicting bats and encouraged to put up bat houses.

The Contractor shall maintain in regular communication with MassWildlife regarding survey results and/or challenges faced in the field so that an adaptive sampling scheme can be employed.

Materials

MassWildlife will provide (as needed):

1) Geographic locations of possible/preferred survey sites.
2) Specific field equipment for surveys (i.e. bands and radio telemetry equipment [transmitters, receivers, and antennas]).

The Applicant will provide (as needed):

1) His/her own transportation to and among sites (and lodging, if required).
2) Appropriate field apparel.
3) Remaining necessary field equipment (i.e. mist netting equipment, acoustic detectors, etc.)
4) Field data forms and formatted Microsoft Excel spreadsheets for reporting survey data.
5) Laptop (or computer) and digital camera (may be a cell phone).
6) GPS unit (may be a cell phone app) and field maps.
7) Weatherproof field notebook.
8) Any other equipment or materials desired by the Applicant.

Deliverables

A Final Report Package detailing the survey results shall be prepared. A binder containing the Final Report Package, in addition to a copy stored on a USB flash drive, should be submitted to MassWildlife by **Friday, October 5, 2018**.

The Final Report Package shall contain the following:

1) An original, signed attestation statement from the Applicant certifying that the information contained in the deliverables is true and complete to the best of his/her knowledge (attestation form to be provided by MassWildlife; a copy of the signed statement must accompany the USB submitted).
2) A detailed summary of the survey results.
3) An electronic copy of Microsoft Excel spreadsheets containing all survey data.
4) Hard copies of survey forms for all surveys completed.
5) An electronic copy of all photos taken during the project, with photos labeled appropriately.
6) Electronic submittal of all MESA listed species into VPRS (NHESP's web-based mapping and data submittal application for reporting rare species observations). NHESP will provide instructions for using VPRS.

Total Funding Available: Up to **$30,000.00**

One applicant will be selected to receive funding, based on their capacity to implement the proposed project and provide a detailed and timely report of results.

To apply, please provide the following information:

1) Project summary: 2-3 sentences
2) Qualifications of project leader(s) and/or sponsoring organization
3) Detailed project scope and methods
4) Detailed project budget with justification

Please limit application to no more than 5 pages, including budget.

Bid Due Date

Bids must be received by DFW by **Friday, April 6, 2018 at 9:00 AM**.

Instructions for Submission of Responses

Submit proposals via the Commonwealth's Online Procurement System – CommBuys, at https://www.commbuys.com/bso/. For application questions, please contact Karen M. Dolan, Finance & Projects Administrator, NHESP at 508-389-6349 or at karen.dolan@state.ma.us.

For more specific project information, please contact Thomas W. French, Assistant Director, DFW, at 508-389-6355 or at tom.french@state.ma.us.